

AMENDMENT UNDER 37 C.F.R. § 1.111 AND
STATEMENT OF SUBSTANCE OF INTERVIEW
U.S. Appln. No.: 10/628,286
Attorney Docket No.: Q76703

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): An image processing method comprising:

generating object regions by dividing an image into objects, and generating a plurality of block regions each having a predetermined number of pixels and having a smaller area than any one of the object regions by dividing each of the generated object regions; recognizing the types of the respective block regions; totaling up occurrence frequency of each of the types of the respective block regions in each of the object regions; and

recognizing the type of each of the object regions based on a result of the totaling;

calculating a type reliability value representing likelihood of each of the object regions being of the recognized type,

setting an image processing condition for each of the object regions by using the type reliability value and the type thereof; and

carrying out image processing, using an image processing apparatus, on each of the object regions by using the image processing condition.

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2. (canceled).

3. (currently amended): An image processing apparatus comprising:

object region extraction means for generating object regions by dividing an image into objects;

block region generation means for generating block regions each having a predetermined number of pixels and having a smaller area than any one of the object regions, by dividing each of the generated object regions;

block region recognition means for recognizing the types of the respective block regions;

and

object recognition means for recognizing the type of each of the objects by totaling up occurrence frequency of each of the types of the block regions in each of the object regions;

wherein the object recognition means has a function of calculating a type reliability value representing likelihood of each of the object regions being of the recognized type, and wherein the image processing apparatus further comprises:

processing condition setting means for setting an image processing condition for each of the object regions by using the type reliability value and the type thereof found by the object recognition means; and

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image processing means for carrying out image processing on each of the object regions
by using the image processing condition set by the processing condition setting means.

4. (original): The image processing apparatus according to Claim 3, wherein the block region recognition means comprises:

block characteristic quantity extraction means for extracting block characteristic quantities from each of the block regions;

mapping means for mapping the block characteristic quantities into a two-dimensional space; and

type output means having a type distribution map that defines the types at respective coordinates in the two-dimensional space, the type output means for outputting the types indicated by the type distribution map at coordinates of the block characteristic quantities mapped in the two-dimensional space as the types of the block regions.

5. (previously presented): The image processing apparatus according to Claim 4, wherein the two-dimensional space is a self-organizing map wherein neurons having a learning ability are laid out in the form of a matrix.

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6. (previously presented): The image processing apparatus according to Claim 4, wherein the block characteristic quantity extraction means extracts a color component, a lightness component, and a structural component of each of the block regions as the block characteristic quantities.

7. (canceled).

8. (currently amended): The image processing apparatus according to ~~Claim 7~~ claim 3, wherein the processing condition setting means sets the image processing condition by calculating a processing efficiency coefficient that depends on the type reliability value and by multiplying an initial image processing condition set for each of the types of the object regions by the processing efficiency coefficient that has been calculated.

9. (currently amended): The image processing apparatus according to ~~Claim 7~~ claim 3, wherein the object recognition means recognizes a category representing whether each of the object regions is an artificial object region comprising an artificial image or a natural object region comprising a natural image, and calculates a category reliability value representing likelihood of each of the object regions belonging to the category, in addition to the type reliability value.

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10. (original): The image processing apparatus according to Claim 9, wherein the processing condition setting means sets the image processing condition for each of the object regions by using the type reliability value and the category reliability value, in the case where the image comprises the artificial object region and the natural object region.

11. (previously presented): The image processing method according to Claim 1, wherein the recognizing the type of each of the object regions is determined as the type of the block regions occurring most frequently therein.

12. (previously presented): The image processing apparatus according to Claim 3, wherein the object recognition means recognizes the type of each of the object regions as the type of the block regions occurring most frequently therein.

13. (previously presented): The image processing method according to Claim 1, further comprising:

calculating a type reliability value representing likelihood of each of the object regions being of the recognized type.

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14. (previously presented): The image processing apparatus according to Claim 3, wherein the object recognition means has a function of calculating a type reliability value representing likelihood of each of the object regions being of the recognized type.

15. (previously presented): The image processing method according to claim 1, wherein prior to the generating the object regions by dividing the image into the objects, sizes of the objects are unknown.

16. (previously presented): The image processing apparatus according to claim 3, wherein prior to the object region extraction means generating the object regions by dividing the image into the objects, sizes of the objects are unknown.

17. (previously presented): The image processing method according to claim 1, wherein the predetermined number of pixels is a plurality of pixels, and the recognizing the types of the respective block regions comprises:

extracting at least a color component representing a color among at least red, blue, or green of each of the plurality of the block regions, wherein the color component is extracted based on the plurality of the pixels within each of the plurality of the block regions; and

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recognizing the types of the respective block regions based on at least the extracted color component.

18. (previously presented): The image processing apparatus according to claim 3, wherein the predetermined number of pixels is a plurality of pixels, and the block region recognition means recognizes the types of the respective block regions by extracting at least a color component representing a color among at least red, blue, or green of each of the plurality of the block regions, wherein the color component is extracted based on the plurality of the pixels within each of the plurality of the block regions, and recognizes the types of the respective block regions based on at least the extracted color component.

19. (previously presented): The image processing method according to claim 1, wherein the object regions are natural images.

20. (previously presented): The image processing method according to claim 19, wherein the natural images comprise an image of a sky, a tree, or a building.

21. (previously presented): The image processing apparatus according to claim 3, wherein the object regions are natural images.

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22. (previously presented): The image processing apparatus according to claim 21,
wherein the natural images comprise an image of a sky, a tree, or a building.

23. (canceled).